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that it was the custom of certain of the Bombay tribes to burn vegetable rubbish mixed as far as possible with the surface soil before sowing their crop, and the value of this practise in European agriculture, though forgotten, is still on record in the books on Roman agriculture. We can go back to the Georgics again, and there find an account of a method of heating the soil before sowing, which has only received its explanation within the last year, but which in some form or other has got to find its way back again into the routine of agriculture. Indeed, I am informed that one of the early mysteries, many of which we know to be bound up with the practises of agriculture, culminated in a process of firing the soil, preparatory to sowing the crop.

My time has run out, and I fear that the longer I go on the less you will feel that I am presenting you with any solution of the problem with which we set out—"What is the cause of the fertility of the soil?" evidently there is no simple solution; there is no single factor to which we can point as *the* cause; instead we have indicated a number of factors any one of which may at a given time become a limiting factor and determine the growth of the plant. All that science can do as yet is to ascertain the existence of these factors one by one and bring them successively under control; but, though we have been able to increase production in various directions, we are still far from being able to disentangle all the interacting forces whose resultant is represented by the crop.

One other point, I trust, my sketch may have suggested to you: when science, a child of barely a century's growth, comes to deal with a fundamental art like agriculture, which goes back to the dawn of the race, it should begin humbly by accepting and trying to interpret the long

chain of tradition. It is unsafe for science to be dogmatic; the principles upon which it relies for its conclusions are often no more than first approximations to the truth, and the want of parallelism, which can be neglected in the laboratory, give rise to wide divergencies when produced into the regions of practise. The method of science is, after all, only an extension of experience. What I have endeavored to show in my discourse is the continuous thread which links the traditional practises of agriculture with the most modern developments of science.

A. D. HALL

THE INTERNATIONAL ESPERANTO CONGRESS

AMERICA has been the scene of many conventions and congresses of a more or less international character, at which delegates representing many diverse lands and nationalities have gathered to discuss subjects of common interest. At these congresses, those attending have been almost as diverse with respect to language as to nationality and the halls of the congress and the places of social gathering and entertainment in connection with it, have usually been filled with well-nigh as much confusion as the historic plain of Shinar. Of course, each of these congresses has had its one or more official languages, in which papers were presented and official business transacted; many of those present being unable to take part in or fully enjoy the proceedings, because of lack of sufficient knowledge of some or all of the languages so used—to say nothing of the embarrassment caused when groups of the delegates met casually outside the regular sessions and free intercourse was restricted, or altogether prohibited, by the barrier of language. How many of those attending, handicapped by the paucity of their linguistic attainments, have looked back upon such gatherings with more or less regret, feeling that they had lost much, yet knowing full well, that from lack of time or otherwise, the possibility of increasing their

stock of tongues was remote and that they could only expect, in similar gatherings in the future, a repetition of the same disappointing experience!

But America has seen a new thing and those who had the pleasure of attending the International Esperanto Congress in Washington during the week of August 14-20, 1910, have experienced a new and pleasant sensation. They have seen a gathering, international in scope, entirely free from the objectionable features enumerated; a gathering of persons from many nations, as diverse as possible in their national characteristics and tongues, but alike in the one respect, that they spoke the artificial auxiliary language, Esperanto, and consequently had a common medium by means of which to exchange ideas when they met, either socially or in convention assembled. The international character of the congress can not be questioned, there having been noted by the writer persons from not less than twenty-three different nations and countries—their varying natural languages numbering eleven. In addition, many widely-separated parts of the world not included in this enumeration, because peopled or controlled by the same race, were in evidence; as, for example, India, Malta and Ireland, whose delegates were Englishmen. Other countries still were represented by men of an alien race; as, Italy by a Frenchman and Peru by an American. The nation without a country also sent its salutations by a Yiddish-speaking member of the Hebrew race.

With most of these persons I had the pleasure of conversing in Esperanto, though often absolutely ignorant of their language; as, for examples, Russian, Spanish or Croatian. One very pleasant social evening was spent in the company of a small party, which included, besides English and Americans, a Spaniard, a Russian, several Frenchmen, a Pole, a German, a Mexican and a Portuguese. None of these gentlemen knew all the languages represented and some knew only their own, yet they conversed together easily and freely. The experience of participating in such cosmopolitan gatherings as this, and still being

able to comprehend and to be comprehended at all times, was not only novel but extremely pleasant. The thoughts and emotions of these men of other climes and tongues, which had been before as a sealed book, were at last approachable *at first hand*, and my mental horizon seemed to broaden and the way to a new world-view lay invitingly open before me.

Besides representatives of Esperanto societies all over the world, there were accredited to the congress, officially, delegates from twelve governments and governmental departments, including besides European and American countries, Persia, China and Japan. In addition, four states of the union sent official delegates and the United States government was also represented by officials of the navy, war and interior departments. All of these representatives who addressed the congress (and most of them did so) spoke in Esperanto except in a very few instances, notably in the case of the Chinese delegate, who used his native tongue. These few addresses were the only ones requiring translation to be universally understood, and even then, only *one* translation—into Esperanto—was necessary.

The entire official business of the congress was conducted in the international language and no translations or explanations, other than those noted above, were required, nor will any Esperantist delegate need to await publication in his own tongue in order to know what took place. The usual sectional meetings incidental to such general conventions were held during the week, and the special interests of jurists, physicians, journalists, teachers, pacifists, engineers, physicists and many others, were considered in the common tongue—this fact assisting in making the meetings more enjoyable, and it is to be hoped, more fruitful, as it permitted a freer and fuller comprehension and discussion of the subjects presented, than was possible under the old methods.

This congress can safely be said to be the first international one ever held in America at which such things were possible, and it is an object lesson in the feasibility, the value

and the practicability of the international auxiliary language.

Although the first Esperanto Congress here, it is the sixth international congress of Esperanto—five having been held previously, the first at Boulogne in 1905 and the others annually thereafter at Geneva, Cambridge, Dresden and Barcelona, in the order named. The congress of 1911 will sit in Antwerp. The same results as to easy intercommunication between peoples of different tongues, described above in connection with the Washington Congress, are reported as having been attained at all the former congresses, and it seems fair to assume that this outcome of continued experiment upon a large scale raises the presumption, that Esperanto is in position to make good its claims as an international means of communication. Even if we take no account of the rapidly spreading Esperanto movement, nor of the testimony which is almost daily to hand regarding its ability to smooth the way of the scientist, the philosopher or the merchant, whose interest reaches out beyond the narrow borders of his own land, still the success of these annual Esperanto congresses, which can not be gainsaid, at least provides sufficient *prima facie* evidence touching the worth of the language, as to demand thoughtful and thorough investigation upon the part of those interested in international conferences of any kind, or in furthering international intercommunication of any description.

J. D. HAILMAN

PITTSBURGH

SCIENTIFIC NOTES AND NEWS

At a special Degree Congregation held at Sheffield University in connection with a visit of the British Association, honorary degrees were conferred as follows: Doctor of Science—Mr. W. Bateson, F.R.S., the Rev. Professor T. G. Bonney, F.R.S., Sir William Crookes, F.R.S., Mr. Francis Darwin, F.R.S., Professor T. W. Rhys Davids, Sir Archibald Geikie, F.R.S., Professor E. W. Hobson, F.R.S., Sir Oliver Lodge, F.R.S., Sir Norman Lockyer, F.R.S., Dr. H. A. Miers, F.R.S., Sir William Ramsay, Professor C. S. Sherrington, F.R.S.,

Sir J. J. Thomson, F.R.S. Doctor of Engineering—Sir Joseph Jonas, Sir W. H. White, F.R.S. Doctor of Metallurgy—Mr. J. E. Stead, F.R.S.

DR. E. SCHULTZE, professor of agricultural chemistry at the Zurich School of Technology, has been given an honorary doctorate by the University of Heidelberg.

M. URBAIN, professor of chemistry at Paris, has been elected a corresponding member of the Madrid Academy of Sciences.

AMONG the representatives appointed to attend the opening of the Mexican National University on September 22 are Professor F. W. Putnam and Roland B. Dixon, from Harvard University, and Professor Franz Boas, from Columbia University.

PROFESSOR JUNIUS HENDERSON and Instructor Wilfred W. Robbins, of the University of Colorado, have been engaged in investigation in New Mexico, being connected with an exploring party of the Archeological Institute of America. Professor Henderson has been studying the geology and Mr. Robbins the botany of the Cliff Dweller region.

A COLLECTION of minerals, containing 200 specimens, for every high school in the state of Colorado, will be one of the results of the work done this summer by the State Geological Survey under the direction of Professor Russell D. George, state geologist. He is supervising five parties which are studying and reporting on the clays and minerals in various parts of the state. A volume containing reports from two of the districts has already been issued.

Nature states that Mr. J. Hewitt, assistant for lower vertebrates in the Transvaal Museum, and formerly curator of the Sarawak Museum, has been appointed director of the Albany Museum, Grahamstown, South Africa, in succession to Dr. S. Schonland, who has resigned owing to pressure of other work. The herbarium is still under the care of Dr. Schonland.

M. EUGÈNE ROUCHÉ, member of the Paris Academy of Sciences, in the section of mathe-